

A NOVEL HORIZONTAL METHOD FOR DISTILLATION AND OTHER GAS-LIQUID CONTACT OPERATIONS

US patent application serial number : 14/366,389
Indian patent application serial number : 6021/DELNP/2014
UK patent application serial number : GB1417427.0

The invention relates to a new method of carrying out all kinds of distillation and other gas-liquid contact operations in horizontal equipment instead of presently in-practice tall vertical tray columns. The horizontal design of the invention makes it extremely inexpensive, easy and safe to transport, install, operate, maintain and troubleshoot, compared with an equivalent vertical tray column. The invention is more operationally flexible in comparison with equivalent vertical tray column and operates within a swelled operating region on vapour flow rate vs. liquid flow rate plot in comparison with equivalent vertical tray column reducing the turndown time due to varied loads. Additionally, a vertical tray column has to be designed considering dead loads, seismic loads and wind loads due to its vertical design. The present invention can be designed without considering dead loads, seismic loads and wind loads due to its horizontal design. In addition, a costly foundation, intermediate supports, ladders and other column accessories are required in a vertical tray distillation column. These components can be avoided for the present invention due to its horizontal design. This results in further reduction in capital cost for the present invention. The design of a horizontal system for a particular gas-liquid contact process can be derived from the design of an equivalent conventional vertical tray column used for the same gas-liquid contact process. The costing of a horizontal gas-liquid contact system and its cost advantage over an equivalent vertical system varies with the composition of the mixture to be separated and other design parameters and also from country to country.

I have developed the invention independently without any affiliation to any organization, university or research lab. The invention is the

result of my extensive knowledge and deep insight in the field of chemical engineering in general and vapour liquid equilibrium and its application to separation of miscible liquids in particular acquired over my career spanning more than 20 years. The invention itself is the result of constant refinement of an idea over many years so as to provide a complete process with guaranteed workability and thorough optimization. An experimental horizontal system as per the invention for separation of a 50:50 mole percent mixture of n-pentane and n-hexane has been developed using my self-developed VLE software, EQ-COMP, developed over the past 12 years and showcased and available for use by paying a nominal charge on my website, www.eq-comp.com.

The invention is ready for licensing/ commercialization and a US, a UK and an Indian patent application for the invention has been filed. Preferably a small experimental system may be developed to remove discrepancies between theoretical design and practical application of the invention. However as the invention is simple to implement so an experimental system may be avoided and the invention may be used directly in the industry by applying it precisely on industrial scale separation systems.